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ABSTRACT

Free-form games are applicable to a range of problem-solving situations. This document discusses gaming as a procedure for organized study of the complex problems entailed in confrontations and crises. The major focus of the booklet is on the various forms of this game type, the kinds of problems to which it is best adapted, and some approaches to its application that have been found to be most useful. It is addressed to individuals and organizations that might consider using free-form gaming as a study technique. Individual sections of the document deal with: (1) an introduction to free-form gaming; (2) the traditional two-playing-teams free-form crisis game (including its uses, structures, required preparation, manning, procedures, post-exercise analysis, and limitations); (3) some suggestions for organizing, conducting, and analyzing free-form seminar games; and (4) variations on the theme (including game purposes, structures, and procedures). A bibliography of 13 references is also included. (TW)

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A RAND NOTE

ON FREE-FORM GAMING

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PREFACE

This Note describes the procedures, appropriate uses, and limitations of the free-form game. It treats the free-form game as a form of organized approach to the examination of certain problems. Free-form gaming is variously termed as "political-military gaming," because its initial and still most common (but not only) application is to the study of military force operations and interactions in a context of international politics; as "crisis gaming," because the typical problem addressed is a confrontation of intensity and time urgency; and as "seminar gaming," in recognition of the seminar-like fashion in which playing teams usually develop their move responses to the problem situations. The designation "free-form" gaming, which will be used hereinafter in the Note, was coined in recognition of the ease with which the structure and procedures may be adapted to best address different problem situations. The term is also used in recognition of the fact that the playing teams are not rigidly constrained in addressing the problems presented--or in the form in which their recurrent moves are formulated--by the input requirements of any analytical model or fixed procedure for the analysis of interactions.

Free-form games are applicable to a range of problem types of varying levels of detail. International interactions in crises and confrontations are at one limit of this range of types. The problem solving activities of one or more decisionmaking entities in a governmental structure in a threatening situation is the other limit. Across this range, the utility of a game is critically dependent on the knowledge and experience brought to it by the players. This means that the designers/conductors of such games must focus on issues of interest to the participants and conduct game operations in a way that efficiently and productively uses the time they commit.

This study, supported by The Rand Corporation using its own funds, should be of interest to those people and organizations that are considering the use of free-form to address complex, interactive problems or to explore proposed approaches to perceived future problems

in which the decisionmaking context is important. Drawn from the author's experience in developing, organizing, conducting and participating in such games, it is intended to offer to future practitioners the extracted results of this experience.

SUMMARY

This Note discusses free-form gaming as a procedure for organized study of the complex problems entailed in confrontations and crises. It is an extract drawn from the gaming experiences of the author, experiences that extend from the mid-1950s to the present. The major focus of this Note is on the various forms of this game type, the kinds of problems to which it is best adapted, and to some approaches to its applications that have been found to be most useful. It is addressed to people and organizations that might consider using free-form gaming as a study technique.

As a study organization, the free-form game occupies a niche between manual war gaming and the study seminar. It shares with the war game a basic use of an established context in which problems are addressed. It overlaps the study seminar in its use of groups of participants with various relevant skills and experiences as a means to approach multifaceted problems. The traditional war game and the usual free-form game both entail a posited set of starting conditions, established procedures for dealing with the problems presented, and a sequence of moves as the game progresses. In both, a control group is responsible for managing the process and for assessing the intermediate and final outcomes of team moves. In the traditional war game, these assessments typically relate to combat outcomes and are based on previously prepared formulae or algorithms. This type of war game entails a requirement that the players express their moves in forms that are adapted to the assessment techniques. In the free-form game, assessments typically relate to a mix of political, military, and other factors, and are based on control team judgments made during the game. The players in a free-form game are not constrained to express their moves in any fixed format. Textual description of the various facets of moves is the typical procedure.

Free-form games may be used for exploring any problem areas in which there is a confrontation or conflict among actors (nations or organizations); confrontations in which there is some existing knowledge

of the nature and operative norms of the actors; and confrontations in which the competitive interactions can occur simultaneously in several "arenas" (political, military, etc.). This gaming format has been used to explore international confrontations, to identify alternative courses of action in a posited conflict, to illuminate potential political problems that might arise from a considered military intervention, to explore options for responding to terrorist actions, and even to project the political and social consequences of building a polluting facility in an urban area.

The basic essentials for the conduct of a free-form game is a group to prepare for, organize, and control the game; players to represent the confronting entities, rooms in which these groups can conduct their deliberations, and some means of communicating among the groups. The traditional free-form game has two playing teams and a control group. The game is initiated as the teams are presented an initiating scenario, describing the situation they face. It typically progresses through several moves with the control group recurrently using the playing teams' moves to develop and present new problem situations to the teams.

Alternatives to this traditional structure and procedures are available. A single playing team structure can be used. More than two playing teams can be accommodated. A single move schedule can be adopted. Playing team move schedules can be either simultaneous or alternating. There are advantages and disadvantages associated with each of these variations. The deciding factors for choosing a variant are the natures of the problems to be addressed and costs. If the basic nature of the problems to be explored entails the interactions of multiple actors across several "arenas" over time, multiple teams and multiple moves are indicated. This is costly in terms of the numbers of participants required and the length of time they must commit. If the problem is focused and amenable to a one-step "solution," a single playing team structure and a one-move schedule is indicated. This variant is the least costly.

The *sine qua non* of a useful study game is the participation of knowledgeable and/or experienced players. The memberships of the playing teams and the control group must each have within them players that are familiar with the imperatives that inform the entities being

simulated; the organizational "tools" available to the major actors; their likely responses to problems; and the capabilities and limitations they might face in dealing with the variety of problem facets. Without knowledgeable participation, a game is--at best--a training game or--at worst--useless.

The necessity of knowledgeable participants in a useful study game imposes several responsibilities on the game designers and conductors. Almost by definition, the time of knowledgeable players is expensive. Because participation is usually voluntary, the game must be designed and conducted in a way that the participants will find personally or professionally useful; in a way that allows them to bring their various expertise to bear on the problems; and in a way that involves them in the post-game analyses of "lessons learned." It also means that the game procedures should be designed and conducted to make an efficient use of the time they have committed.

The conclusion drawn by this writer/practitioner is that the designers and conductors of free-form games must recognize and accept these responsibilities.

ACKNOWLEDGMENTS

My debts to Rand collegues (and others) are so extensive and so long standing that I despair of making full acknowledgments. In the early years (the 1950s), Ed Paxson and Thomas Schelling were most influential in directing my interest to gaming as a study device. In the later years, Milton Weiner's and Carl Builder's gaming exercises have provided many opportunities for observations of procedures and approaches. I am particularly appreciative of Arnold Horlick's continuing interest in free-form gaming; a continuing interest that has been a source of encouragement. I owe a major debt to many of my Rand collegues who, as playing team members over the years, have repeatedly suffered through the dilemmas presented. An equal debt is owed to other Rand colleagues whose distaste for and distrust of the seemingly chaotic processes and nebulous products of gaming have led them to avoid association with this study procedure. In so doing they provided a constant reminder that other, more orderly procedures are frequently available and useful, and that the limitations of free-form gaming and the validity of conclusions so developed must always be acknowledged. Nancy Nimitz--over the years--has served this saluatory role.

Of course, none of these bears any responsibility for the exposition that follows. I have admittedly been very selective in exploiting our shared gaming experience. Any errors, oversights, or misplaced emphases are mine alone. Gaming, especially free-form gaming, is peculiarly reflective of the designer's/conductor's point of view of the problems treated and the proper organization of a group to explore such problems. It follows that an exposition of the subject can only be a compilation of the author's opinions.

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I. INTRODUCTION

The essence of gaming is problem solving in context. In many forms of gaming, the context is a set of formal rules for making moves and for assessing results. In free-form gaming, the number of formal rules is minimized. The context is largely the substantive problems of a posited international confrontation or inter-institutional crisis. No formal rules for assessing outcomes are used. Intermediate and final outcomes are based on judgments concerning likely outcomes if the posited situation had actually occurred.

Free-form gaming was first developed and used at Rand in the mid-1950s by Dr. Thomas Schelling (with this writer playing some small role). Its initial form was the political/military crisis variant. The initial reason for this development was some dissatisfaction with the limitations of the more apolitical war games being conducted, and with the lack of treatment of military force factors in international political games previously conducted. The simple fact that it was widely adopted and has continued to be used (in various forms) since then suggests that it enjoys some general acceptance as a useful study procedure in a range of problem areas.

Free-form gaming has been used to explore such national, policy-level problems as:

a. Responding to the threats or actions of a potential enemy
b. Identifying alternative courses of action in a confrontation
c. Intervening in a ongoing conflict
d. Responding to terrorist-instigated developments

Free-form gaming has been used to explore more narrowly focused problems such as:

a. Exploring for possible inadequacies in the assumed political and military situations underlying military contingency plans

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b. Identifying the decision problems entailed in deploying and protecting a highly specialized, uncommitted military unit (such as a reserve mobile missile unit) in a combat situation
c. Illuminating the social, legal, and political issues entailed in constructing a potentially hazardous industrial facility in an urban area

The adoption of the free-form game as a study device brings with it certain procedural requirements and limitations. Any study game demands a considerable amount of pre-game preparation and efficient management during the exercise. Any study game, to be useful, must have a substantively informed design and playing teams whose members (in combination) bring knowledge of the issues and processes being simulated into the exercise. The free-form game is particularly sensitive to these desiderata.

Free-form games, as study procedures, have limitations imposed by practical manning and game management considerations. They cannot adequately represent the multiple and diverse staff and systems operations (as differentiated from functionally induced biases) that go on in "real life" national crises. Therefore, they shed little light on proposed alternative staff procedures and their attempted use for such study purposes is ill advised. Similiarly, they rarely can be used to cover a simulated crisis from beginning to end, because of the need to limit the scheduled time (real time) of participants. Nevertheless, they permit the coverage of enough problem points in the course of a simulated crisis-over-time (game time) to illuminate most of the substantive (as opposed to procedural) problems and issues of interest.

The free-form, human team format does not lend itself to a detailed and mechanically rigorous comparative analysis across several games. A series of games conducted with the same players is inevitably biased by learning from game to game. And a series using different players (different human inputs and different approaches to the problems presented) makes mechanistic comparisons impossible. These are not serious limitations if the problems and issues of interest are of a more substantive (than procedural and outcome-oriented) nature. Player

learning is an important study game "output" and comparative analyses of the "survival" of proposed measures across several games are both feasible and useful.

The sections below proceed in sequence through a discussion of the typical, two-playing-teams free-form crisis game, with its required preparations, trans-game procedures and post-game analyses. It ends with a discussion of some structural and procedural variants with their utilities and limitations.

As is the case with most endeavors involving the organizing of a group of people, the organizing and conducting of free-form games is a matter of personal style. It follows that any attempt to describe the structure and management of such an exercise will inevitably convey the personal views of the writer. This paper is no exception. It is drawn from this writer's experience in developing, organizing, conducting, and participating in such games. It is intended to offer to future practitioners the extracted results of this experience. The reader will, I hope, detect in the author's approach an interest in the types of problems addressed in free-form gaming and an even greater interest in and sense of responsibility to game participants as they address the problems presented.

Notes on Terminology

Playing Team: A group of participants whose task is to simulate the decisionmaking and problem-solving processes of a designated group or organization, usually the top level policy makers of a designated nation.

Red and Blue: A common way of identifying the playing teams for administrative convenience or when discussing a game or gaming generically.

Control Group: A group of participants whose tasks are to recurrently present problem situations to the playing teams, simulate the decisionmaking of such other nations and organizations whose actions are important to the problems and their

resolutions, assess the intermediate outcomes of playing team moves, and manage the game process itself.

Real Time: The actual time and/or date. Thus, a game might be scheduled for the periods 0830 to 1630, 18 September 1985 through 22 September 1985 (real time).

Game Time: The simulated time and/or date of the problem posed to the playing teams. Thus, a particular game problem in the hypothetical game above might be dated 15 June 1985 (game time).

II. THE TRADITIONAL TWO-PLAYING-TEAMS FREE-FORM CRISIS GAME: ITS USES, STRUCTURE, REQUIRED PREPARATIONS, MANNING, PROCEDURES, POST-EXERCISE ANALYSIS, AND LIMITATIONS

This section covers the free-form game procedure in summary form with a primary focus on procedures. Some of the more subtle issues and styles of game design and play are shown parenthetically. The basic point is that in a free-form game substance and procedure are inextricably intertwined. Just as in the conduct of a study seminar, adequate manning alone is an insufficient desideratum for a useful exercise. Planning, preparation, and thoughtful exercise management are also necessary.

In a sense, there is no such thing as a "traditional" free-form crisis game. The structure and game procedures are so conveniently variable that marginal changes to fit the problem at hand are not uncommon. And the purpose (or purposes) for which games may be conducted can vary considerably. Hereinafter, the two-playing-teams structure variant will be treated as the "traditional" form.

A. USES

Free-form gaming has been used to illuminate the interactions among a considerable variety of institutions, organizations, or political entities. Typically, the interacting entities are two nations (or alliances) in a postulated confrontational situation. The free-form format has also been used to simulate the interactions of parties involved in legal litigations and even the confrontational interactions among industries, environmentalists, and government regulatory bodies. The range of game uses or purposes is usually dependent upon player familiarization with the issues and "actors" simulated, with a treatment of the organizational plans and capabilities, and either actual or contemplated changes of such plans and capabilities by one or more of the parties involved. In another dimension, free-form games have been used for the introduction of newly formed study teams to the subject at hand, to encourage mutual teaching and learning among participants, to demonstrate an operational concept, and to develop a body of "synthetic

history" for subsequent analysis. It is difficult to "measure" the utility of such game applications but the simple fact that gaming continues to be used for such purposes strongly suggests that the practitioners and participants find the procedure to be useful.

B. GAME STRUCTURE, PROCEDURES, FACILITIES, AND PROTOCOLS

The traditional free-form game is organized with two playing teams (occasionally three or four) representing the decisionmaking groups heading the confronting entities such as nations (or factions or sub-national agencies). This organization is particularly applicable when the participants are knowledgeable and experienced in dealing with the relevant issues. A control group "plays" all other significant actors such as agencies subordinate to the decisionmaking groups, "intelligence," and natural phenomona. The control group also manages the game procedures and, when required, assesses the intermediate and final outcomes of such interactions as military combat and responses to diplomatic initiatives. The game exercise is initiated by presenting to each of the playing teams a written, initiating scenario that describes the situation it finds itself to be in (along with a description of antecedent developments) and a "fact book" describing the characteristics and capabilities of the organizational and mechanical "instruments" that they (and their opponents) can control. The playing teams are also provided a set of game instructions covering the procedures they can use to solicit additional situation information and to make their game moves.

The teams are given sufficient time to assimilate the information provided and debate and decide on the move they will make. Typically, the "game clock" (game time) is stopped during the playing teams' move-generating periods and, typically, all teams are asked to make their moves simultaneously (in both "game time" and "real time"). This simultaneous game move schedule economizes on the time of the participants by avoiding the delaying of one team's deliberation while it waits for the other playing team to move. (A variant on this game schedule is the so-called "ping-pong" schedule, in which playing teams take move turns, basing their move selection on the information they receive about the move made by their opponent team. This produces a

more focused game but, as noted, is wasteful of players' time.) The playing teams end their move period by preparing a written set of instructions to the agencies they control and by specifying, in writing, any public or private communications to other entities (simulated by the other playing team or by the control group), and by specifying any contingent moves they desire if certain (specified) developments eventuate. The playing teams' move period ends with the delivery of their move papers to the control group.

The control group initiates its move period by assessing the new situation that has been developed by the moves of the playing teams, by assessing the intermediate outcomes of any interactions, and by positing the reactions of such other actors whose actions are simulated by the control group. This new situation is then described in written form. A part of the control group's move advancing process is the movement of the "game clock" (game time) to a selected later time. The control group's situation advancing "move period" ends with the delivery of the new situation description back to the playing teams. Obviously, the descriptions of the new situation provided to the playing teams are different for each team, covering those features of the new situation that each simulated entity would likely know about the situation in a similiar "real life" circumstance. This ends one game cycle.

The game may progress through several such cycles. The control group is practically constrained in its selection of the next "game time" and game situation by the moves that the playing teams have made, by the requirement to assess and portray plausible, but not necessarily the most likely intermediate outcomes of the interactions indicated, and by the need to avoid skipping over situations in which the playing teams might wish to change their selected courses of action. Any significant violation of these constraints represents an unwarranted and distracting intrusion of control into the roles of the playing teams and is certain to reduce the value of the exercise. Typically, the game is moved through several such advancing cycles with new problems (or new features of the original problem) presented at each juncture. Three or four cycles, each taking some three to four hours (real time) for the playing teams plus an additional three to four hours by control, is usual. The usual limiting factor on the number of cycles allowed is the "real time"

scheduled for the game. For highly focused problem study, it is possible to confine the game to a single playing team move period. It is also possible in such cases to have only one playing team. However, this kind of truncation of the playing team move cycle should be used with care. It is possible that a playing team's considerations and resulting move (problem solution) may be different if its members know that they have only one move to make from what they would be, if the team knows that they will have to "live with" the results of their move as they face up to later move situations. The single playing team variant risks having the players feel that they are being unduly manipulated by control.

The facilities required for a game are:

1. A room for each playing team and the control group in which each can freely discuss, debate, and plan their moves (without risk of being overheard).
2. Tables, maps, reference materials, and chalkboards to facilitate team discussions and move paper preparation.
3. Secretarial assistance in converting drafts into typed copy.
4. Some method of moving papers from room to room.
5. Reproduction equipment for the rapid production of multiple copies of game papers.

These minimum requirements can be satisfied with a few secretaries, typewriters, runners, and a duplicating machine. A more efficient arrangement (where it is possible) is to use computer terminals for the preparation of game papers and an electronic message handling system for moving papers from room to room. This satisfies the requirement for legible, multiple copies and the maintenance of game records.

Two important game protocols are worth mentioning at this point.

1. Participants on all teams (and the control group) should be enjoined to avoid discussing team group game plans, game rationales, game assessments, or other game-related matters outside of their respective game rooms from the time (real time) that they become privy to the substance of the game

problem and their team roles until the (real time) completion of all the scheduled game moves. Uncontrolled or unintentional "leaks" can so bias subsequent moves that the utility of the exercise is seriously compromised.

2. During game play, every message originating from playing teams or from members of the control group must be presented to the game director for his study and approval before being duplicated and passed on to addressees. The game director bears the final responsibility for keeping the overall game focused on the objective problems. This responsibility makes this detailed "hands on" control of messages absolutely essential.

C. GAME MANNING AND TEAM ORGANIZATION

From the summary description of Game Uses and Structure given above, it should be obvious that the expertise with which the problems are addressed in a game is critically dependent on the collective knowledge (in the playing teams and the control group) of the "real life" issues and the capabilities of the organizational and mechanical "instruments" to be used during game play. Such "real life" game inputs are essential. Extensive, detailed instructions to naive players is an inadequate substitute. Thus, if the issues to be addressed in a political/military game include the simulated movements and uses of military forces and simulated diplomatic negotiations pointed toward the acquisition of active allies and, possibly, war termination, it becomes important that at least one person on each playing team (and in the control group) be familiar with force operations and plans and, similiarly, that at least one be familiar with diplomatic operations. Many game situations call for additional expertise in a variety of subject areas.[1]

Since the team move period debate shares some of the procedures and utilities of the seminar, the minimum team size that is desirable is three or four. More players are preferable, up to a maximum of some 15 or so. Teams of 20 players or more usually result in some members hardly contributing at all.

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[1]Team debate provides a very useful context in which the operational skills of one player can be transferred to team mates.

The organization of the playing teams is typically a matter of taste, with the team itself often making this their first order of business. To the extent that the team move period is to resemble a seminar, under-organization is to be preferred to over-organization. There is, however, an irreducible minimum of organization necessary. Substantively, a seminar needs a directing chairman to manage the debate; the playing team is no different. Procedurally, the team is expected to conform to a directed schedule (real time) in submitting their game move papers. It follows that a designated team manager is indicated, responsible for assigning the writing tasks and ensuring that game schedules are met.

The control group requires a bit more organization. In addition to its substantive task of recurrently developing and presenting study-relevant problem situations to the playing teams (a task that requires both collective substantive knowledge of the issues and staying on top of the team play), the control also is responsible for maintaining its part of the game schedule and keeping the records of the game. Experience indicates that the direction of these two different tasks be divided between a Game Director (responsible primarily for the substantive direction of the game) and a Game Manager (responsible for ensuring that the game mechanics are handled smoothly).

D. GAME PROCEDURES

Most of the basic procedures of free-form game mechanics have been suggested above. In summary, the process has the control group recurrently presenting a written description of a problem situation to the playing teams. They respond with a written description of the actions (directed or contingently directed) that they wish taken. The cycle of presented problems and responses moves the simulated situation over simulated time (game time).

Some game procedures are dictated by the nature of the problems being addressed. In depicting the initial situation for playing team consideration, it is important that the scenario be focused on the problems of interest. The playing teams will inevitably have the problem of organizing and

developing a team focus and this can waste more of their time than is desirable if the initiating scenario is unfocused. This focusing, however, must be done with care. To present to a team a problem to which there is only one reasonable solution or to present selected reports on the situation at hand that has the effect of steering the playing team to a preselected (by the control group) solution is to waste or misuse the players. The problem situations presented should always have two or more (unstated) alternative solutions.

There are some practical constraints that must be observed in preparing the initiating scenario. The initiating scenario should posit a future situation and its problems. That (game time) future should be projected far enough (from current real time) to allow the posited development of the kinds of problems of study interest. On the other hand, the game time and situation should not be so far into the future as to present problems that are alien to the players' interests and current knowledge. The bounds usually translate into between six months and two years. Within these bounds, the novel problems can be posited within a familiar context.

In making situation advances (game time) between playing team move periods, it is important for the control group to respect the playing teams' "decision space" and that the control group does not, in their situation advancing papers, make moves for organizations and/or equipment that are notionally under the control of a playing team (unless the playing team in its move paper has directed such a move; in this case the move is mandatory). The playing teams must address the presented problem situations as serious "real life" possibilities. The control group, in projecting the problem situation, must both match that seriousness and, simultaneously, select a projection that will tend to force the playing teams to look at the developing problem in a new light or focus on the new problems raised by past solutions. The control group must never forget the study objectives of the game at hand and lapse into simply presenting problems for the sake of presenting problems.

Control has considerable freedom in developing the situation since it can "control" natural phenomena, the performances of the organizational instruments available to the playing teams, the

resolutions of intermediate outcomes, and the moves of other relevant entities not being played by the playing teams. This freedom is to be exercised with care and discretion. A playing team whose members come to feel that they are being maliciously or capriciously manipulated by the control group (for no apparent study purpose) cannot be expected to address the presented problems seriously. Projections that incorporate adverse natural phenomona, markedly imperfect organizational implementations of directives, assessments of other than expected outcomes, or unexpected and troublesome behavior by (unplayed) third parties are tolerable but should never be used unless they contribute to the game purposes.

Throughout the game, the control group must concern itself with the playing teams' motivations, with the plausibility of its problem projections and assessments and with its handling of uncertainties. These are related concerns. The dominant motivating factor for the playing teams should be the obvious real life relevance of the problem situations. The scenario developer and the control team are constrained by the need to develop and maintain this primary motivation. The problem situations presented at each game juncture must be plausible from the points of view of the players. "Plausibility" thus becomes a control team assessment of the conditions that the players will find within the realm of real life possibilities. The scenario writer is forced to make this assessment on the basis of consultation with the game sponsor. During the game, the control group can make these assessments on the basis of noting the alternatives suggested by the players during their move debates. A control group projection of the game situation that resembles one that the players have considered is more likely to be viewed as plausible (and therefore not demotivating) than a situation they have not conditionally anticipated.

The handling of real life uncertainties by the control group in making projections is similiarly constrained. In a more structured game type such as a war game, calculable uncertainties may be resolved by a random draw, by deliberately introducing chance. The playing teams in a free-form game face situations in which many of the analogous real life uncertainties are incalculable. This is a sufficient factor to make their decisionmaking interesting and motivating. As a general rule, the

control team--in making their assessments and situation projections--should resolve all uncertainties (calculable and incalculable) on the bases of plausibility and the study purposes of the game. The control group's responsibility to maintain the focus on relevant problems mitigates against their use of chance in resolving calculable uncertainties.

Closely akin is the control team problem of confidently perceiving the true intentions of the playing teams' move papers. Almost by definition, game move papers are prepared in haste. In consequence, they may be ambiguous. It is an important responsibility of the control group to make every possible effort to resolve any such ambiguities (and to avoid comparable ambiguities in the projection papers they prepare). A game can as easily be "thrown off the study track" by inadvertent misinterpretations as by deliberate, capricious manipulation. Both are to be avoided.

E. POST-GAME ANALYSIS

Some free-form games receive little post-game analysis. A game that has been conducted for mutual (cross-participant) teaching and learning or has been run to demonstrate a concept in operation has achieved or failed to achieve its purpose by the time the game is over. Post-game analysis in such cases can add or correct little. This subsection is directed to the post-exercise analysis of games conducted for study purposes. For such games, post-exercise analysis is appropriate.

It is perhaps best to start by asserting that games are not reliable predictors of outcomes-in-detail. The artificialities and limitations of the gaming process itself and the impossibility of using a few small groups to simulate major nations and organizational institutions ensure inaccuracies. Free-form games are not like "hard" numerical analyses with accurate inputs and reliable models. (However, we have all seen "hard" analyses whose rigor was more apparent than real.) Free-form game "findings" are inevitably suggestive only and need to be tested against "real life" knowledge and expertise. (Comparative analyses of the findings of a number of similiar games are possible and useful and can be treated numerically. Before such an

analysis is undertaken, it is important that the individual game findings have been tested for "real life" relevance.)

It is admittedly audacious for any one analyst to presume to specify how any analysis should be conducted. Analysis is a highly idiosyncratic business. It follows that the discussion of the analyses of free-form game outputs below is that of the author. The reader is free to disagree.

There are two basic forms of analysis that can be brought to bear on the products of free-form games. One form resembles the process used to analyse and report the results of a study seminar. This is a form of group introspective asking of the questions, "What (collectively) have we learned?" "What new insights relating to the interactions of the elements of the problem have we gained?" and "To what extent are the lessons learned and the insights gained relevant and important to the real world problem or process?"

As a hypothetical example, assume that a game is conducted for the purpose of studying the factors at play in a controversy between two South American nations. Further assume that the game intiating scenario and game reference material are carefully prepared and reflect, as accurately as possible, the actual international political postures, military capabilities and deployments in the area, and the intra-national factions that may have some influence on events. Still further assume that the scenario portrays the local confrontation situation not as it is at the time of writing but as it well may be within a year. Finally, assume that the game is played with representation on both playing teams and the control group of people who collectively have operational knowledge of the factors and forces at play.

The analysis of such a game would, almost certainly, reveal that some important facets of operational knowledge brought into the game by one or two participants had become general knowledge. This development is important for the analyst to observe as an indication of the sort of game findings that can be reported without risking player disagreement. Further, it may be that the game interaction of international and domestic political factors, economic considerations, and military limitations had been such that no one specialist had foreseen and that, at least suggestively, a similiar interaction might occur in real life.

The important information gained, in this hypothetical case, is that a broader and more comprehensive look at the real life situation is in order. This is reinforced if the participants generally agree that the various factors had been played with reasonable fidelity. Careful, off-line, post-game study is certainly indicated. The second form of analysis is applicable to the materials collected from a series of games, all addressed to (or applicable to) a common problem area. This allows a crude form of quantitative analysis of the frequency with which certain relevant developments recurred in the games (and survived the test of post-game assessment of "real life" relevance). In effect this type of multigame analysis "says" that the reporters note that a variety of knowledgeable players of a game series have (or have not) generally agreed that certain phenomona and effects evinced in the game series have important "real life" relevance. This is particularly important when the game outcomes vary markedly from pre-game expectations or are notably counterintuitive. Applied to our hypothetical South American example, any such repeated findings would certainly reinforce the conclusions reached.

F. LIMITATIONS

There are a number of problem areas and phenomona that are involved in international decisionmaking and "move" interaction which the two-playing-teams, free-form game is ill-fitted to address. The typical two-team game, for example, can shed litle light on the consequences of institutional incentives (or propensities) in large intra-national advisory organizations. No small group can precisely duplicate the micro activities that go on in actual large organizations. Because of this simplification, free-form games are limited in the accuracy with which they can reflect the time required for real, large organizations to perform their advisory functions. (This limitation can be partially circumvented by using subteams playing specific advisory agencies.) Another area of interest is the performance of specific equipment and specific types of organizations (such as a Marine battalion). The free-form game, with its seminar-like team operations format, is best used at the policy and strategic decisionmaking level. The operations of

specific equipment are best studied by computer simulations and/or detailed manual exercises such as a war game. Experience indicates that the seminar-like organization of the free-form game ill fits exercises to simulate (in detail) specific (real life) personalities whose actions may have major impacts on the situation being played. This is not to say that the playing teams are to be barred from considering the possible effects of leadership personalities and reflecting such considered effects in their team moves. Rather, it means that the game-initiating scenario and the control team situation advancing papers had best treat organizations and nations as the entities of interest and leave the more detailed and personal treatment to the playing teams.

Another limitation of this kind of gaming as a simulation of "real life" is that the control group cannot input into the playing team decisionmaking process all the "signals," messages, irrelevancies, and "noise" that typically would be directed toward the real life elements they are playing. Nor could the playing teams handle such a disparate flow if the control group could furnish it. This is not to denigrate the game as a study process but rather to give final emphasis to the following point: **The free-form game is not a device for the confident prediction of the outcomes of possible future events.**

III. SUGGESTIONS

This section reports some extracts from experience with the organization, conduct, and analysis of free-form seminar games. It is given in the form of suggestions rather than as dicta in recognition of the fact that this form of exercise readily lends itself to structural and procedural experimentation. Other practitioners may have had other experiences and may proffer other suggestions.

A. PROBLEM TYPES AND LEVELS OF DETAIL

Experience has shown (a conditional phrase that will hereafter be omitted but should be implied) that the free-form game is best addressed to a posited problem situation involving a conflict of interest between two or more organizational entities, such as nation states or large organizations or institutions within a state. The important feature is that the expected behavior of such entities be somewhat predictable, albeit controversially so. The level of detail at which the problem is to be presented should be at this nation state level. Specific personalities having a major influence on the actions of the entities simulated should not be presented in the problem since predictions of their likely behaviors are certain to be subject to considerable disagreement. This is not to deny the playing teams the opportunity to play personalities if they wish, but the presentation of the problem situation should avoid cueing them to do so. It is permissible to use leaders' names (as in "Hitler" or "Castro") as long as it is obvious that the state itself is the focus (as in "Hitlerian Germany" and "Cuba under Castro").

Similiarly, in the handling of military forces (and the other operational agencies the playing teams and the control group control), the game is best played at the aggregate force level. Attempts to present or play at the detailed, tactical level are likely to prove too time consuming to be a practical mode of game operation.

Problems with a predominantly diplomatic negotiations focus are not well handled in the free-form game. Diplomatic negotiations require a rather summary treatment in the game. Since the playing teams can move only at the end of their move periods (and in the typical game there are only three or four moves), the game cannot support the extensive interactions inherent in negotiations. The usual procedure for a team that wishes to include diplomatic negotiations in its move is to so assert and accompany this with an indication of its maximum and minimum acceptable objectives. The control group will rule for or against their attainment.

B. PLAYING TEAM ORGANIZATION AND MOVE PROCEDURES

The minimum essential organization of the playing teams is one that reasonably assures that the situation faced is adequately assessed, the alternative courses of action are explored and the selected course of action(s) described in textual form with sufficient detail and precision for the control group to understand the moves desired. This to be accomplished within the time (real time) scheduled for the team's move period. The team leader, usually designated by the game director, bears this administrative responsibility. Any further team organization is a matter of team choice and convenience.

In considering further organization, several factors should be kept in mind. On the one hand, one may choose to assign team members with special skills or experience to handle the assessments and prepare the paper describing the selected action(s) within their area of specialty. This tends to ensure informed treatment and expedition in dealing with such specialty problems. On the other hand, one may choose to deal with the problems presented in the group seminar fashion, and wait to assign the writing of the selected action(s) after the team has decided on a set of moves. This looser organization is likely to take more time than a team organized by specialties. However, it has the advantage of exposing specialists to the expertise-in-operation of their colleagues and encourages an overview of the problems presented. This is an advantage that is not to be lightly forgone. Some balance between the two forms of team organization is suggested.

One variation on the unitary playing team organization is possible and useful if conditions permit. This is a team organization (and move schedule) in which the basic team assesses the situation and develops a course of action (or alternative courses of action). At that juncture (perhaps half way through the move time allowed) a designated senior player (or small group of senior players) arrives, is briefed on the situation and the team's proposed moves, and either approves, modifies, or completely alters the move to be made. The remainder of the move period is devoted to the preparation of the papers describing the selected course of action. This form of organization is only possible when the game is being played in a location convenient to the seniors. It has the advantage of allowing the involvement of experienced players with a minimum expenditure of their time. It has the additional benefit of exposing the players to the operational understanding and experience of a knowledgeable senior.

Team procedures and suggestions on how to handle them are perhaps best discussed first in rather mechanistic terms and then in terms that take into account the game objectives and the requirements of the other teams. In mechanistic terms, each team move period (usually three to four hours in real time) is devoted to situation assessment, action(s) selection, and write-up. For complex problems, this can be a demanding schedule. The first team problem--in every move period--is likely to be a belief that more information about the situation faced is both necessary and, in real life, would probably be available. The playing team is permitted to communicate requests for such additional information to the control group, who will respond as quickly as possible. (If control agrees that the requested information would--in real life--be available, the information will be provided. If the control group disagrees, the request will be denied. Thus, control must have a very adequate understanding of what information is likely to be available at what time from what sources.)

Given the tight move schedule, the tasks of writing the various components of the selected moves should be assigned to individual team members. This, in turn, means that the final team move paper will not be a masterpiece of coherent literary writing. Different writing styles

will be apparent. But this is not important if--and only if--the text accurately portrays the team's intentions. Accuracy and completeness are more important than style. It is suggested that the team leader use a check list of the components of the move in assigning team members to writing tasks. It is further suggested that the team leader read all of the papers so prepared to ensure that the complete move is covered and that arcane terminology, meaningful only to members of a specialty area, has not crept in. The terms and acronyms used (and well understood) in one specialty area can be unintelligible or (worse) seriously misleading to a reader not of that community.

The first move period is initiated with a scenario that describes the problem situation to be faced. Almost inevitably, such a scenario will describe a series of developments leading up to the situation at hand; a series of developments which the team members will feel that--had they been playing--they would have handled differently and the problem presented would never have evolved. In gaming terms, this is called "fighting the scenario." The suggestion (or plea) is that the teams consciously defer judgments on scenario plausibility to the post-game critique. Fighting the scenario takes valuable time and--as in real life--nothing useful can be done about past events. The playing team moves should be developed with a recognition that the control group is to use the actions described to develop and portray the next problem situation which will be faced in the future (game time). In developing this projection of the problem situation, the control group has the option of advancing game time by minutes, hours, or days. This means that the playing teams' moves should indicate the sequence and schedule of actions desired extending out into several days of the (game time) future. It also means that when the playing team is presented with their next move problem, game time may well not have been moved as far into the (game time) future as they had expected. This uncertainty about the (game) time of the next move presents a problem to the playing teams. In many instances, they can foresee some possible opponent actions that might occur during the span of (game) time that their moves cover and will understandably wish to have an opportunity to react in a reasonable way. To cover such possibilities it is permissible for the teams to describe their intended courses of action (and the sequence and

schedules of their planned occurrences) plus contingent instructions about what to do if a foreseen possibility occurs.

The dual role of the control group (playing all otherwise unplayed nations and entities and acting as the arbiter/assessor of the interactions produced by the directed actions of the playing teams) raises a problem for the playing teams. To responsibly implement the moves of the playing teams and to assess the outcomes of the interactions, the control group must understand the plans and intentions of the playing teams. But in real life such plans and intentions would be carefully hidden from all other nations and entities. This evokes a natural inclination on the part of a playing team to mask their plans and intentions from control. (In gaming parlance, this is termed "fighting control.") The suggestion or plea appropriate to this problem is "Do not keep secrets from control." The members of the control group understand the problem and will handle the information accordingly. Failures by a playing team to share the knowledge of their plans and intentions can only lead to inappropriate assessments and situation projections by control and prevent the attainment of the game objectives.

In playing the game, participants will--naturally--know that they are in a game. No serious attempts are made to make the physical and procedural gaming situation resemble the environment or procedures of any "real life" decisionmaker or decisionmaking group. This may tempt the players to "play the game" rather than address the "real-life" issues that are exposed. The suggestion (or plea) here is "Play the "real life" issues, not the artifacts and limitations of the game."

During their move periods, the playing teams may identify a previously unthought of problem of apparent relevance, a problem whose solution would require lengthy and detailed calculations and considerations. The players are to be enjoined to make a note of any such problems but not to take the time required to arrive at a resolution in detail. The best procedure is to expeditiously approximate the problem's likely solution and incorporate it into their move. Lengthy and detailed study of previously unsuspected problems is best deferred until after the game. In fact, the identification and post-game resolution of such previously unsuspected problems can be an important game output.

C. CONTROL GROUP TASKS, ORGANIZATION, AND MOVE PROCEDURES

The control group has responsibilities both before and during the game. They have to organize the exercise, arrange for player participation, arrange for the necessary facilities, develop the initiating scenario, develop a contingent game plan, manage the game (both procedurally and substantively), conduct the post-game general critique and--if a formal analysis and report is indicated--draft the post-game papers. (It might be more precise to say that those people who have developed the initiating scenario and contingent game plan can play only in the control group. They will have too much knowledge of the purposes of the game and the control group's plan of operation to serve on a playing team.)[1] Many of the basic procedures and uses have been covered above. This subsection is addressed to suggestions for their accomplishment.

It has been noted above that the teams' collective knowledge should encompass operational expertise in the management of real-life organizational and mechanical instruments that the teams are to manipulate in the game. It is suggested that this be done with some caution. If, as is often the case, the game is being conducted by and in a particular organization or institution that has developed a community mindset toward the problems being treated and the participants are drawn exclusively from that institution, it is possible that few new insights will be developed. At least one non-expert, one neophyte, should be assigned to each team to ensure that any community-accepted "solutions" are challenged. Iconoclasts are useful (in games and in seminars).

Careful preparation for a game is important. As noted above, this is typically the responsibility of the people who will later be members of the control group. It is good practice to have the initiating scenario present a problem to which there are at least two apparent solutions, preferably a dilemma in which no solution is seen as cost and risk free. It is useful for the control-group-to-be, during the pre-

[1]Of course, the participation of knowledgeable and experienced players must be arranged with their knowing the purpose of the proposed game. The information to be denied them is the control group plan for responding to contingently foreseen game developments.

game period, to prepare by attempting to assess the likely playing team moves (to include apparent alternatives) and contingently plan their responses--planned responses that will focus the playing teams on relevant new problems no matter what course of action they initially select. It is the control group's responsibility to maintain the playing teams' focus on relevant problems throughout the game. Contingency planning with this in mind can help to avoid delays during the play. A not uncommon way of conducting such preparations is for the control-group-to-be to conduct an informal and truncated game of their own beforehand. Such a preliminary game can reveal weaknesses in and omissions from the initiating scenario that can be corrected before the real game.

It is a common practice to start the game with a combined meeting of all participants. This gives the Game Director the opportunity to introduce himself and outline the (real-life) schedule of the exercise and the basic procedures that are to be followed. Experience indicates that this meeting should be short and that the Director/Speaker confine his remarks to procedural comments. A lengthy oral briefing on the simulated situation posed in the initiating scenario is to be avoided. An oral briefing may encourage the players to omit a careful study of the written scenario and thus miss some important information. And an oral briefing of the initiating scenario in a full meeting risks conveying to one playing team much too much information about the problems their adversary is facing.

One essential requirement must be satisfied before the playing teams start their play. They must be told (by the Game Director) "who they are," i.e., what real-life decisionmaking group they are to simulate. In the typical free-from crisis game the teams may either represent the highest level national decisionmaking body of the nation they are to simulate or they may represent a (real or hypothetical) advisory group to the top national level and formulate their moves in the form of recommendations.[2]

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[2]It makes little difference which alternative is chosen. In the first case, the control group will treat the teams' move papers as being directive. In the second case, the control group will, normally, assume that any recommendations have been accepted and, again, treat the recommendations as directives.

The playing teams must be informed of the limits within which their moves may be made. A team, for example, may specify (either unconditionally or contingently) an action or commitment and schedule of specified military forces. They cannot in their move specify the efficiency with which the action is taken nor can they specify the outcomes of combat military encounters. These latter two specifications (and their analogs in other operations) are in the domain of the control group.

The control group has a comparable set of constraints. Although they are responsible for assessing the manner and efficiency with which a playing team's directed action is taken and for assessing the outcomes of combat (and other) interactions, they cannot/should not direct the moves of the units and equipments controlled by the playing teams. Any infringement of this control team constraint will be deeply (and understandably) resented by and distracting to the playing teams.

Following each playing team move period, the control group must assess the interactions of the moves made by the playing teams and select and specify (in a written paper) a new and later game time and the new problem situation to be faced by the playing teams when they next convene. This is a complex operation. When the playing teams reconvene for their next move period, they must be able to see--in the control-prepared description of the new situation--a projection of the actions they directed in their last moves. Control's assessments of an intermediate outcome need not be the outcome which they assess as the most likely, but it should be an outcome that the playing teams will find plausible and possible.

The control team must always keep in mind the objectives of the game and their contingency plans for repeatedly focusing the attentions of the players on the objective problems. The control group must be prepared to abandon its contingency plans and adopt a new approach if the moves made by the playing teams are such that the contingency plan cannot be implemented without control infringement on the domain of one or both playing teams. Better the plan be abandoned than such a distracting infringement. In formulating the new, advanced problem situation, control--acting for nations and entities not played by the

playing teams--may specify actions and postures taken by such external entities so as to contribute to the focusing of the problem. In doing so, control should avoid depicting such actions and postures in a way that is obviously implausible. Again, the actions and postures need not necessarily be those that might be deemed most likely but they must be distinctly possible.

In preparing its inter-move projections, the control group may specify the occurrence of natural events such as inclement weather or other possible adverse phenomona not controlled by man. As a general rule, such "manipulations of nature" should be avoided. While the equivalent of the "lost horseshoe nail" may occur in real life and cascade into very adverse strategic consequences, such low-probability events are best omitted in games.

During game play the control group may be presented with a situation (caused, in part, by the moves of the playing teams) in which it is difficult or impossible to present relevant and difficult problems to both teams for consideration during their next move periods. The situation may present a study-relevant problem to one team but no problem at all to the other. This difficulty can be compounded by an apparent need either to adhere to the contingent game plan (necessitating intrusion into the decision domains of one or both playing teams) or to abandon it. In such cases it is usually best to abandon the contingency plan and present the problem to one of the playing teams. This leaves the other team with no particular problem for its next move period. In such a case, the control team may either recess the unchallenged playing team or direct it to spend its move period making projections of possible opponent moves and planning how they would be dealt with. The control group is obliged to respect the intentions of the playing teams' directed moves, and execute them with as much fidelity as possible (within the noted bounds of plausibility). Unfortunately, the playing teams' move papers are often, of necessity, prepared in haste and may not clearly specify their intentions and priorities. A specific, team-directed action that they consider to be of vital importance may appear in a single sentence in their move submission, whereas an afterthought of little consequence may be covered in several paragraphs. To assist in ensuring against such possible

misunderstandings, it is useful to have a member of the control group in each of the playing team's rooms, observing while the team debates and develops the move plans. This observer can later advise the control team when it meets to formulate a new projected situation. This is a demanding assignment. The observer must suppress his own subjective beliefs and biases while being as perceptive as possible. Here we come to an ironclad rule of control team member behavior. A control team observer in a playing team's room may only mutely observe. He may in no case participate in the playing team's debates and discussions. If a playing team member asks the observer a question (either scenario substantive or game procedural) the observer is obliged to adjourn to the control room to obtain an answer. Any violation of this ironclad rule can lead to the Game Director's and control team's loss of understanding of what is going on--substantively--in the game, with subsequent misunderstandings and misprojections that reduce the game to chaos. The time commitments and efforts of all participants are too important to risk wasting this way.

Some practitioners of free-form gaming have chosen to use closed-circuit television or other audio and video devices to permit control group observation and recording of playing team sessions. The author's experience has been that such elaborate and expensive arrangements are hardly worth the trouble. Direct, in-room observation is at least as effective and no more distracting to the playing team. And video-audio recordings are rarely used. There is, however, one factor that should be considered in arranging for direct, in-room observation. If the game is being conducted in an organizational or institutional environment that has a strong rank or prestige structure, the in-room control observers should be selected so that they are of comparable rank or prestige to the playing team members. Significantly higher rank observers may inhibit the playing team's discussions by creating the impression that they are being graded on the basis of their play. Any appearance of grading the playing teams' play may reduce the utility of the exercise and be counter-productive.

The members of the control group are usually--in real life--members of an organization and/or citizens of a nation being played either by one of the playing teams or by the control group itself. It is quite

natural for such members to unconsciously identify themselves with the play of their real-life affiliate. This can introduce confusion into the control group's debates if it is not consciously avoided. A useful rule for control group members is to never use the terms "we" or "us." They may be referring to "we, the control group" or to "we, the organization or nation with which the members have a real-life affiliation." The use of such terms as "the control group," "the United States," and "the U.S. Army" in control group discussions reduces the chance of confusion.

The final group activity of a free-form game is usually a group critique are the exercise with all participants in attendance. The organization and conduct of this post-game critique are the responsibility of the control group in general and, usually, the personal responsibility of the game director.

There are several factors that should be considered in preparing for and conducting such critiques. One is the obvious fact that the playing teams have just completed an exercise that was not without its frustrations. They have been forced to deal with a serious problem or developing problems while being denied information would have made their problem solving much easier and more effective; the lack of information that may well not be available in a similiar real-life situation is nevertheless frustrating. The teams have just completed a series of moves, each of which has led to other problems, each of which did not quite satisfy their expectations or goals. Fate, in the guise of a malevolent control team, has repeatedly intervened to frustrate their best efforts. And they will have experienced additional frustrations because of the artificialities introduced by the game structure, move schedules, and procedures. As a Rand colleague once observed, one reason for holding a post-game critique is "therapy." The Game Director owes the playing teams a candid explanation of why information was withheld and why certain intermediate outcomes of interactions were assessed as they were.

But an even more important reason for conducting a post-game critique relates to the real-life study purposes of the game. The Game Director or (or critique chairman) should discuss the real-life problems that were simulated in the game (which should explain why certain

information was withheld and why some assessments were made) and not only make a preliminary assessment of applicability of the game results to the real-life problems, but also invite the erstwhile playing team members to relate their insights. It is, of course, critically important to explore the effects of pure game phenomona on the outcomes and participant insights. The identification of game-produced insights into problems of real-life relevance is best conducted as a group activity and the post-game critique--with its recent, shared experiences serving as very effective, referential analogs--is an ideal setting for such a group analysis.

In procedural terms, it is usually best for the Game Director to start the critique with a brief summary description of the substantive moves made, in sequence, by the playing teams and the inter-move assessments and situation projections made by the control group. This is followed by the leaders of the Red and Blue teams, in turn, briefly explaining of the series of situations as they had seen them and their rationales for the moves their teams had made. Following these brief summarizations, the Game Director may go directly to a discussion of the real-life problems that had been illuminated (from his point of view) and invite the playing teams to follow with similiar observations. This is then followed by a general, analytic discussion. Only after completion of the discussion of real-life relevant problems that were suggestively dealt with in the game is it appropriate to open the floor to discussions of game structure and mechanics and the tendering of suggestions for procedural improvements to be considered for future games.

IV. VARIATIONS ON THE THEME: GAME PURPOSES, STRUCTURES, AND PROCEDURES

To this point in this essay, the discussion has been directed to the traditional two-playing-teams, free-form game conducted to illuminate problem areas in the interactions of nations (or other entities) in a posited confrontational crisis or conflict. There are other purposes that may be addressed, other game organizational forms that may be adopted, and other gaming procedures that may suggest themselves. Many such variations have been made in the past with some success. Others have been attempted with little substantive results except providing additions to the gamer's list of "good things not to do."

A. ALTERNATIVE PURPOSES

Some rather special "results" are frequently observed as a product of free-form gaming. Its quite natural to consider gaming for such purposes. The gaming process typically results in the participants gaining a new and different way of looking at the real-life problems whose analogs have been simulated. It typically results in a great deal of informal cross-instruction among the participants (sharing individual areas of relevant expertise and experience) about the various factors that impinge on the problems and influence their solutions. The gaming process results in a considerable degree of professional socialization in informing the participants about how their colleagues approach the kinds of problems played in the game. And the game itself provides a convenient referencable analog to support later discussions about similiar real-life problems. The game can assist in the identification (or highlighting) of subproblems that may or may not be amenable to detailed study and resolution in the limited time available during the game itself, but can certainly be noted as important candidates for post-game study and analysis using other procedures. Games can make a contribution to the training of the participants for dealing with real-life problem-solving operations. And there is the feature of gaining insights into the possible effects of contemplated changes in real-

life equipment and/or organizational arrangements and procedures (or the operations of existing equipments and procedures that cannot be tested in real life).

All of these game process outputs are potentially useful and the primary purpose of any particular game may be selected from this list. It is worth noting that no matter which primary purpose is selected, some, if not all, of the noted results will evince themselves as a result of the play. Game purpose is therefore a matter of intended focus. It follows that in the more detailed discussion of alternative purposes below, the boundaries between possible purposes that are suggested as being distinct are actually more a matter of degree.

First, let us deal with some nonrecommended purposes. Some past games have appeared to have been organized and conducted with no well-defined purpose. This unfortunate happenstance can occur as a consequence of a potential game sponsor with an ill-defined problem or notion for a problem solution interacting with an irresponsible and overly ambitious proponent of gaming in general. Only with luck is this kind of game likely to prove worth the time and effort (and expense) involved in its organization and play. An even more preverse application is to demonstrate the efficacy of a "solution" or "strategy" that is inherently flawed. (The proposed establishment of a new human organization to correct the adverse consequences of the bureaucratization of existing organizations is one example. The demonstration of a proposed strategy whose effectiveness depends on the opponent being incredibly stupid is another.) Such games are at best expensive ways of demonstrating that the proposal is a bad one. At worst (with heavy game overcontrol to achieve the forgone conclusion), the game is subsequently cited as proof of the notion's efficacy.

One quite useful application of free-form gaming is to orient and familiarize a study group whose task is to conduct research in a particular problem area. It can be a rather informal process. Since the game is conducted before the study, the problems presented may subsequently prove to have been off the mark. This is not too important. The desired output is a group that shares a common general view of the problem area (or at least has identified any areas of disagreement) and has a shared experience that can be later referenced,

as an analog, for better research team intercommunications. The objective is to enhance research team communications, by allowing them to compare (or contrast) research findings with an incident or outcome in a previously played game. For example, a group addressing the problem of developing nuclear attack options can benefit from a game in which they had been required to consider the selection of a nuclear option in the context of a developing simulated situation.

A similiar application is in dealing with a study problem or set of problems whose major characteristics are reasonably well understood (or thought to be so) but the relative importance of some vaguely perceived (or suspected) subproblems is not so clear. A game in which the major problems are presented and dealt with will often make clear which of the subproblems should receive subsequent study priority. In the hypothetical study of nuclear options posited above, the need for military effectiveness may have been generally foreseen. But a game that posited simultaneous, ongoing negotiations might reveal that military effectiveness can be less important than attack timing or the "message" intended by the attack.

A not uncommon application of gaming is to test a proposed solution to a problem that is generally recognized as being important. Gaming in such cases can be useful if (and only if): (1) The problem has been correctly identified (an example of a misidentified problem might be one in which inadequate communications equipment is thought to be "the problem" when really "the problem" is a chronic misunderstanding caused by conflicting biases among involved institutions); (2) the problem is one that lends itself to being presented in the semi-dynamic context of a game; and (3) the sponsor of the game (who may well be the proponent of "the solution") is prepared to see the idea "sink or swim" as the game progresses. A proposed "solution" to a problem being tested in a game is best viewed as a research hypothesis, not as a certainty. A proposed confidence-building measure, for example, may prove--in a game--to reduce (rather than build) confidence. This kind of game finding can be important. If, however, the game to test a proposed solution to a well-defined problem is one of a series of testing games (and the game series uses different players in each of its individual exercises), some degree of cautious confidence in the efficacy of a "solution" that

survives the series may be in order. In effect, in such cases, the tentative assessment of the efficacy of the surviving solution is, "Most reasonable and knowledgeable people who have tested this solution in a series of games have found it to have relevance to the real-life problem."

Another purpose for conducting a game is to study the way that the different opposed teams develop different perceptions of the developing problem situation and misperceptions of the intentions and driving motivations of their opponents. This kind of study purpose is often associated with the simulation of two nations in a confrontational crisis. It is true that the development and consequences of perceptions and misperceptions between nations in crises in real life is a serious problem, warranting serious study. It is also true that differences in perceptions and cross-team misperceptions are usual game phenomona (often with a marked, apparent similarity to those noted in past real-life crises). When using games for this purpose the designer/analysts should be cautious and careful. The analyst/observer of a game team's move debating periods may infer and record perceptions and risk being off the mark. Alternatively, he may--at several move junctures--query the players concerning their perceptions of the moment and record the answers. This latter method of trapping team perceptions must be done with care. The simple fact that a question about specific perceptions is asked may alter the perceptions at issue. The playing teams can be queried and recorded during the game with near neutral biasing effect, but it must be done carefully.

There is another problem associated with this use of free-form gaming to observe and assess developing perceptions and misperceptions. The analyst must be concerned about the degree to which he is observing game phenomona that are only relevant to the game itself, as opposed to game phenomona that have some suggestive relevance to real life. In the process of gaming the control group is the source of information about the situation that is recurrently provided to the playing teams. It is easy, intentionally or unintentionally, for the control team to generate (or invite) specific perceptions and/or misperceptions by the playing teams. (No responsible game director would ever do this intentionally unless the desired phenomonon is obviously analogous to real life.) The

analyst of such game-produced data should also query and record the intentions of the control team during the game.

This writer admits to a preference for avoiding the interjection of analyst queries about playing team perceptions (and control group intentions) during the course of a game. The risks of unintended biasing are considerable and, worse, creating the illusion that the respondents are being observed "like white mice in a maze" may cause player resentments and distract their attention from the issues at hand. I prefer to wait until the post-game critique to ask the players about their intra-game perceptions and bring them into the consideration of the possible real-life relevance of their perceptions and the consequences.

A special case of the use of free-form gaming to study perceptions and misperceptions involves the use of playing teams to simulate the operations of functional organizations/institutions that are acting as advisors to national governments in confrontations. (See Alternative Game Organizations, below.) It is easy to observe the development during a game of a functional bias in a subteam that is charged with both the simulated management of a functional agency and the advising of a top-level government team about the moves to be made. The development of such functional biases is especially pronounced if the subteam (or teams) is isolated from the top-level team's debates. And the similarity of the subteam bias to that imputed to or observed in the real-life institution they are simulating is remarkable. In past games, "military advisory" subteams under a (simulated) U.S. government (team) in confrontations have tendered advice that closely resembles that of the U.S. JCS in similiar real-life situations. Similar functional behavior biases comparable to the U.S. State Department can be observed in a "Foreign Service" subteam. And the use of functional subteams almost guarantees the development of alternative perceptions (and misperceptions) during the course of a game, even if identical information inputs are provided to the various subteams. The effects of functional biases on perceptions are strong and strongly suggest real-life relevance.

But again, care and caution are indicated. In a game organized and conducted for such purposes, the organizer and the control group have major responsibilities. It is important that the various subteams have members that are knowledgeable about or have experience in the agencies/institutions being simulated. (The presence of such expertise is important, not because the verisimilitude of the subteam's play depends on this but rather because the expert is the best equipped to assess the real-life relevance of the observed game phenomona in the post-game critique.) The control group (in both the initiating scenario and in their provision of inputs to the subteams) must provide realistic information (in the forms and in the quantities required to engage the subteams in the performances of their assigned functions) while avoiding the tailoring of inputs that might (intentionally or unintentionally) substantively steer the subteams' deliberations. Substantive overcontrol can be seriously counterproductive to the game study objectives.

Finally, free-form games can be usefully applied to the education of player participants who in real life perform a function that has some important bearing on the management of some real-life agency in the kind of situation being simulated. Notice here that I have used the term "education" rather than "training." An agency functionary who plays on a team must not only simulate the managing of the agency from which he comes but also the managing of other subordinate agencies and dealings with other nations. This kind of game experience can make the operations of real-life agencies more predictable and understandable to the erstwhile players. This can be a very useful game product of considerable real-life importance.

Functional training of a team of agency functionaries is perhaps best conducted in a physical and informational environment more closely resembling that expected in real life than is usually possible in the obviously artificial environment of the usual free-form game. Exercises conducted for functional training are typically based on the assumption that the correct procedural responses to situations are known and the problem is simply to train the actors in those procedures. This places the functional training exercise outside the normal area of interest to the typical user of free-form games.

The usual form of the free-form game has two playing teams (typically Red and Blue) and a control group. Other structural forms are possible.

One such variation in form is the single playing team (Red or Blue) plus a control group. This variant is certainly less expensive in the numbers of players required and since knowledgeable and subject-experienced players is a necessity if the game is to be most useful (and typically, the time of such players is valuable), any economies are worth considering. This kind of minimal manning structure is best applied to the addressal of problems whose main focus is to be found on one side. (The dual role of the control group in such a one-sided game--playing both the opponent and the assessor of move interactions--may seriously reduce the likely relevance of the control moves to the real-life problem.) There is an additional feature of the one-team game that may cause some problems or at least some discomfort to the people on the playing team. Since the control group not only "plays" the opposition, but also assesses the outcomes of move interactions, the solitary playing team can come to feel at an unfair disadvantage and manipulated. In this kind of game the control team, more than in any other form of game structure (although it is important in all) must scrupulously avoid any appearance of biasing move assessments against the playing team.

Another variation in structure has individual playing teams assigned to simulate each of several nations. In other words, this game structure has several playing teams. This more elaborate structure is worth considering when the study problem of interest has more than two major actors. This obviously increases the costs in terms of the number of players required and the time involved in inter-team communications. More serious, however, is the significantly increased burden that this structure puts on the control group. Since the control group, at every move juncture of a free-form game, must assess the outcomes of the teams' move interactions, this assessment process becomes progressively more complex and (real) time consuming with every increase in the number of playing teams. Also, at every game move juncture, the control team must judge what new information about the new situation should be made available to the various playing teams (and prepare the intermediate

papers that convey such information). Here again, the task becomes progressively more complex and time consuming with each increase in the number of playing teams. These are important considerations since the period used by the control team in making assessments and preparing information inputs to the playing teams is a period in which the playing teams are idle. In addition to being a waste of valuable persons' time, overly long delays between playing team move opportunities can lead to a loss of interest and attention. Experience suggests that four playing teams are the maximum that a manual control group can manage and service with acceptable efficiency.

There is a variation on the multi-playing team game structure that is worth considering when the problem of interest involves the interaction of functional agencies that also have an advisory role--agencies that are subordinate to a national-level playing team. (See "Alternative Purposes" above.) This structure has one or more subteams, subordinate advisors to the top-level team and available to it (via communications) to suggest moves and/or recommend moves. This structure, as noted, does induce a realistic functional bias into the way the advisory subteams assess the problems presented and deal with queries and requests from the top-level team. Again, this structure is expensive and places a considerable burden on the control group. To make the process realistic and suggestively relevant to real-life problems, the control group at each move juncture must not only provide to the top-level team that information that the real-life entity they are simulating would receive but also provide institutionally accurate information to the advisory team(s). Again, we have the problem of inordinate delays between playing team moves. And again, four teams (counting the subteams) are probably the practical maximum number in a fully manual game.

B. ALTERNATIVE MOVE SCHEDULES

As noted above, the typical free-form game has the two playing teams making their game moves simultaneously (in real time and in game time). This is the most efficient game move schedule in terms of minimizing the idle, between-move time of the playing teams. But this simultaneous move schedule ill-fits the game for the simulation of inter-

team negotiations. Any proposal or reaction to an opponent's proposal that is part of a playing team's move cannot be brought to the attention of the addressee/opponent until the next move period is initiated. This means that messages generated and sent at one juncture (in game time) are received at a considerably later game time and situation. And it is possible that two messages will cross paths, that the two teams will simultaneously send two quite different proposals (and receive that sent by their opponent). This can foment confusion.

One way to deal with this kind of problem is to use a "ping pong" move schedule; to schedule Red and Blue move periods alternately (in both game and real time). This kind of alternate move schedule will support a crude simulation of negotiating exchanges (but not very effectively since the typical game only extends over three or four moves per playing team). And again, this kind of schedule is expensive in the use of players' time and introduces additional delays since the control team must prepare its move projections and papers between each playing team move.

(One reasonably effective way of dealing with this negotiations problem in a simultaneous move game is to direct each playing team to designate one of their members as "negotiator" and, as part of their move development, instruct the negotiator. During the subsequent control group projection period, these two (perhaps with the Game Director) are brought together to write a paper describing the outcome of the negotiation. The two negotiators do not simulate negotiations, but, rather "step outside of their team roles" and freely consult and compare so as to develop the outcome projection. The results of this consultation is then made a part of the control team projection and input to the playing teams for their next move. The erstwhile negotiators then finish the game playing on the control group. (They each know too much about the opponent team's perceptions and plans to continue on their original playing team.)

Another variation of the schedule of a simultaneous move game is simply to schedule only one move for the game. This is obviously more economical than multiple moves. Such a game schedule is appropriate when the problem or process of study interest is one that can be reasonably portrayed and addressed in a single move session. But there

is a hidden hazard here. There is always a question as to whether a team will approach and attempt to resolve a presented problem in the same way, knowing that they have only one move to deal with it, as they would knowing that in a subsequent move they will have to deal with some new problems arising from their solution to the first one. Experience suggests that if this kind of one move schedule is adopted, the future penalties and risks associated with alternative possible solutions are made clear as they face the presented problem.

Most free-form games are conducted with game time "standing still" as the playing teams hold their move development schedules. Game time is advanced by the control group as a part of their problem projection. The only time schedule that the playing teams are asked to meet during their move periods is a real-time schedule (specified by the Game Director) for the delivery of their completed move papers to control.

Some problems of study interest may have a critical timing dimension and this can lead to consideration of running a game with the "game clock" running (during playing team move periods). As a general rule, free-form gaming is ill-fitted to handle this kind of forcing schedule. The decisionmaking playing teams in a game are denied the assistance of the large support staffs that the entities they are simulating possess. In this situation the "ticking of the game clock" will, at best, seem to be a contrived artificiality and, at worst, lead to unthoughtout or even frivilous move decisions. If this kind of schedule is to be used, it becomes critically important that the problem situation to be played be sharply focused and comprehensively presented. The playing teams must have the time needed to deal with the problem. Otherwise, little of study relevance can be expected.

C. ALTERNATIVE CONTROL GROUP PROCEDURES

The overall expense in the use of knowledgeable people's time has led game designers, not surprisingly, to explore methods of both minimizing the total personnel commitment and to minimize the idle time periods in games. The simultaneous Red and Blue move period games, the one move games, and the one-playing-team games discussed above are all attempts to effect such economies. One of the most conspicuous users of manpower and producers of idle periods for the playing teams in a free-

form game is the inter-playing team move periods in which the control group is making its projection of the new situation and preparing its projection papers. Again, not surprisingly, one can consider methods and procedures for minimizing the time and manpower involved.

1. One way of minimizing the control team manpower requirement that has been attempted on occasion is to use the two-playing-team members as control group projectors between playing team move periods. This obviously minimizes the number of permanent control group members needed. And it does avoid idle periods for the playing teams. This procedure has the novel feature of moving the free-form game format much closer to that of a study seminar. Unfortunately it brings with it one of the limitations of the seminar as a means of studying an interactive developing problem situation. Because the playing teams, at every control group's situation projecting juncture, interact in agreeing on a projection of the situation, they become quite aware of their opponent team's perceptions of the situation and, often, their opponent's intentions. This form of gaming procedure is inappropriate for dealing with problems in which different perceptions and possibly erroneous predictions of the opponent's intentions are important parts of the problem at hand.
2. Another approach to assisting the control group in its inter-playing team move projection periods (and thus reducing the time required) is to use a computer with a simulation model to project those features of the competitive situation that can be modelled. This is, typically, the operation of military forces and their interactions in combat. This kind of control team assistance can vary from a simple micro-computer application to an extraordinarily complex simulation using a complex model and a very large computer. In the more complex model use, the projection of the modelled part of the situation may be deterministic or stochastic. A game that is conducted with the control group using this kind of aid is appropriate as a study procedure if, and only if, the focus of the problem at

hand is outside of the modelled operations and interactions and the users have confidence in the accuracy of the model itself. If the heart of the problem is in an area covered by the model, no game is necessary. One simply exercises the model. If the problem is outside of the area covered by the model, but is sensitive to model outputs, the computer and its model are given a large degree of control of the developing problem to be addressed by the playing teams. This may prove to have an unfortunate effect on the course of a study game by focusing team attention away from important study problems. It is the Game Director's job to keep the playing teams focused on problems of real-world relevance. It is difficult or impossible to program a computer to perform this function.

3. Another approach to the use of computers in the gaming process is to constrain the kinds of moves that the playing teams can make (and the way they can specify their moves) to the kinds and forms of inputs that the computer simulation model can accept and implement. Placing this kind of constraint on the playing teams violates the definition of a free-form game. While this kind of game may have considerable utility for the training and education of the players, for problem exploration purposes the presence of playing teams is hardly necessary. A more efficient approach is simply to have the model user run the procedure himself with repeated variations in the moves made at important junctures. Naturally, for either purpose, confidence in the accuracy of the model is implicit.
4. A still greater move away from the free-form game for study purposes is worth noting here. The Rand Strategic Assessment Center (RSAC) development has taken the ultimate step by automating not only the projections of the control team (and the management of the game processes) and also automating the operations of the playing teams themselves in a model that approximates many of the factors covered in a free-form, political/military game. Since all of the projection-of-interactions models are deterministic, this development allows repeated runs of the "game" with exploratory variations on many

of the important assumptions. In short, the RSAC automated game permits an analyst to very expeditiously conduct the equivalent of an extensive series of manual games by systematically altering the input assumptions that--in manual gaming--inform the players' moves and the manual control group's projections. Compared to the manual, free-form gaming process, the gain in efficiency is enormous. But the price paid for this gain can be found in two areas. The automated game can only be readily applied to the conflict and confrontation problems that are within its modelled domain. While this domain is extensive, it is not unlimited. A more important price paid can be found in the analyst's presentations of his findings from the exercises conducted. After the experience of playing in a free-form game, the players have informed conclusions about the important features of the situation played and an equally informed opinion about their real-life relevance. The game itself is both the study of the problem and the equivalent of the briefing of the findings. The analyst/user of the automated game enjoys no such conditioned audience when he comes to convey his findings.

V. IN CONCLUSION

In the discussion above, the author has covered both many of the forms and uses of free-form games and, in the process, identified and discussed some related study procedures. This was intended to indicate where, in the wide spectrum of possible study procedures, the free-form game is to be found and to suggest the kinds of problems to which it is best applied. The conclusions at which the reader is encouraged to arrive are simply stated.

1. Free-form games are best used to address complex problems involving confrontations of opposed decisionmaking entities, problem areas that are well enough understood to allow the positing of situations in which alternative proposed solutions can be brought to bear. (If the problem is not that well defined, it is not a practical candidate for gaming. If it is completely defined and bounded, computer modelling should be considered.)
2. Effective free-form gaming involves the use of participants who are knowledgeable and/or experienced in the various real-life factors and organizations that would be at play in the real situation. Thus this kind of study process is expensive in terms of the time commitments of knowledgeable people. The addressal of trivial problems should be avoided.
3. Since such knowledgeable (and expensive) people are to be involved, the game designer/game director must commit himself to the preparations and intra-game management processes most likely to gain and hold the interests of the participants in the problems to which the game is addressed.
4. A free-form game is an organized exercise in the interaction of competing ideas about the nature of the problem at hand and its best solution, with the competing ideas brought into the exercise by the participants. It follows that any conclusions about the "real" nature of the real-life problem and the likely

efficacy of any "solution" is formed in the minds of of the participants during the exercise and taken away by them after the game. The deriving of conclusions from a game is an activity to be engaged in by all participants. Thus any conclusions arising from a free-form game should be documented and reported only with the agreement of the players. They, as well as the observing analyst, have been participants in a study exercise and their "findings" are important.

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